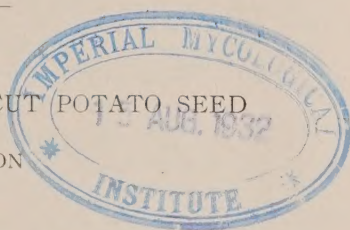

New York State Agricultural Experiment Station

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DUST TREATMENTS OF CUT POTATO SEED

E. E. CLAYTON



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DUST TREATMENTS OF CUT POTATO SEED

E. E. CLAYTON¹

ABSTRACT

The value of dusting seed potatoes after cutting was studied over the 4 year period of 1928 to 1931. The potatoes were cut and stored in the manner usually followed by growers and accurate records of stand and yield were secured from replicated field plats.

It was found that many chemicals applied to cut seed actually promote decay. This was true of all mixtures containing copper compounds, sodium bichromate, sodium fluoride, dinitrophenol, and beta naphthol. Mixtures containing sulfur, gypsum, lime, calomel, and creosote appeared harmless.

Field tests showed that sulfur, and in some instances gypsum, reduced stands and yields when the seed was cut, treated, and stored 3 to 4 weeks before planting. The same treatments had no bad effect on seed cut and stored a week to 10 days before planting.

Treatment with a mixture of sulfur and lime, equal parts by weight, or with a charcoal dust containing 3 per cent creosote, increased the stand and yield of potatoes cut 3 to 4 weeks before planting, as compared with untreated seed, but had no effect on seed cut a week to 10 days before planting.

With the exception of the sulfur-lime combination, none of the treating materials had any visible effect on the corking over of cut surfaces and all lots appeared in perfect condition at the time of planting. This was true even of the sulfur-treated lots which decayed badly following planting.

Under farm storage conditions, the sulfur-lime dust treatment resulted in the formation of a thicker, tougher protective layer over the cut tuber surfaces than did any of the other materials.

INTRODUCTION

The dusting of potato seed after cutting with sulfur, lime, or gypsum is undoubtedly a very old practise, but one still followed by

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many growers both in the United States and abroad. Sulfur is most commonly used in this country, despite the fact that the dusted seed is often very unpleasant to handle at planting time. Definite experimental proof of the value of such treatments appears to be lacking, but authorities tend to the view that they will do no harm and may, under some conditions, do some good.

Stuart² says, "The freshly cut seed handles better if sprinkled as cut with land plaster, air-slaked lime, or flowers of sulfur. These materials tend to dry the cut surface and lessen the danger from heating if the weather is warm and the seed is not planted immediately." Also, "The curing or drying process is facilitated by the use of one of the absorbents mentioned, and then placing the seed in slatted crates or spreading it out in a thin layer on the floor of a frost-proof house, if it is in the winter season, turning it over once or twice during the first 24 hours, and once each during the following 2 days; after which the cut surfaces are generally dry enough to permit being stored in barrels, sacks, or bins until needed for planting. Some growers prefer to handle their seed in this manner rather than to cut it as needed, claiming that they obtain much better results."

Writing on the same subject in England, McIntosh³ says, "The practice of liming (cut seed) would not appear to be of great value provided the above conditions (which promote thoro corking over of cut surfaces) have been attained; however, where the conditions are unfavorable, and particularly where cut seed must be kept some time after cutting, liming may be practiced with some success." It is to be noted in both instances that the suggestion is made that the dusting of cut seed would be of most value when this seed is to be stored some time before planting.

The purpose of the experiments reported here was to determine the value of dust treatments for cut seed. The potatoes were stored under uniform and as nearly optimum conditions as it was possible to secure. As to what constitutes optimum storage conditions, we have fortunately very clear and definite information. Appel⁴ and Shapovalov and Edson⁵ both found that high humidity and moderate temperature favored rapid and complete corking over of cut surfaces,

²Stuart, Wm. *The Potato—Its Culture, Uses, History and Classification*. Philadelphia: J. B. Lippincott Co., Ed. 3. 1928. (See pages 60–61.)

³McIntosh, T. P. *The Potato—Its History, Varieties, Culture and Diseases*. Edinburgh: Oliver & Boyd. 1927. (See page 145.)

⁴Appel, O. Zur Kenntnis des Wundverschlusses bei den Kartoffeln. *Berichte Deut. Bot. Gesell.*, 24: 118–122. 1906.

⁵Shapovalov, M., and Edson, H. A. Wound-cork formation in the potato in relation to seed piece decay. *Phytopath.*, 9: 483–496. 1919.

and that dry air was very harmful. Wright and Peacock⁶ conclude that "seed potatoes may be cut as far in advance of planting as at least 21 days with good results, providing the cut seed is stored under proper temperature (40–50°F) and humidity (around 95 per cent) conditions." Considering time of cutting, Lombard⁷ concludes that "any seed cut 7 to 27 days before planting gave a greater yield than fresh-cut seed." He obtained maximum results with seed cut 7 days in advance of planting.

EXPERIMENTAL METHODS

The experiments were conducted on Long Island. The seed used was all stored in a potato cellar where conditions very nearly approached those described as ideal for the storage of cut seed. The varieties used were Irish Cobbler and Green Mountain, and the very best grades of certified stock were used thruout. The cut and whole seed were all kept in the storage cellar, except for a couple of hours as the lots were brought out, cut, dusted, and returned. Also, while cutting and dusting, the pieces were kept cool and protected from drying. The cut lots were stored with other potatoes piled around and with a layer of burlap bags on top, to insure uniform conditions for all. The lots were cut at intervals of from 1 day to 1 month before planting, as it appeared established that it was safe to cut seed at least this far in advance.

In applying the dusts, an ordinary wire mesh sifter was used. The pieces were dusted, mixed, and poured into another container, and this process repeated until all cut surfaces were covered. Records were kept of the weight of materials, of temperature and humidity conditions, and of all other matters which might have an effect on the results. These data are given only in instances where they appear to have had a bearing.

The number of treatments was reduced from year to year and the number of plat replications increased, as it became desirable to make more accurate measurements. Data were taken in terms of percentage stand and percentage weak plants when the plants were 6 to 10 inches high. In the fall the crop was dug and weighed. The weights in all experiments were of marketable tubers.

⁶Wright, R. C., and Peacock, Wm. The storage of cut seed potatoes. *Proc. Amer. Potato Asso.*, **14**: 131–136. 1927.

⁷Lombard, P. M. Old vs. fresh cut potato sets. *Proc. Amer. Potato Asso.*, **14**: 57–65. 1927.

THE 1928 RESULTS

The year 1928 was devoted to a survey of the possible materials and combinations of materials that might be used for dusting cut seed potatoes. In all, some 40 mixtures were prepared in a ball mill and 5 pounds of seed pieces were dusted with each mixture. The lots were stored 2 weeks and then examined. A large number of copper compounds were tested, and without exception the potatoes so treated were decayed. Decay was most pronounced with soluble copper salts, such as the sulfate, and least with insoluble coppers, such as the oxide. All these lots were discarded. Other mixtures which facilitated decay contained sodium bichromate, sodium fluoride, dinitrophenol, and beta naphthol. Seed treated with sodium benzoate and superphosphate, while not actually decayed, had the cut surfaces either discolored or shrunk. After a careful examination, 11 lots were selected which showed cut surfaces well corked over and in perfect condition. These, plus the untreated checks which were also well corked over and in perfect condition, were planted in field plats on April 20, which was 16 days after cutting. Each plat consisted of 25 hills. The data on the 1928 experiments are given in Table 1.

TABLE 1.—EFFECT OF SEED TREATMENTS ON STAND AND YIELD OF POTATOES IN 1928.

DUST	NO. OF PLATS	PER- CENTAGE STAND	PERCENTAGE GAIN OR LOSS IN STAND DUE TO TREATMENT*	YIELD IN LBS.	PERCENTAGE GAIN OR LOSS IN YIELD DUE TO TREATMENT*
Sulfur.....	6	81.3	—15.6	36.7	— 9.6
Gypsum.....	6	96.0	—	40.8	—
Creosote, 1%.....	2	96.0	—	44.0	+ 8.4
Creosote, 2%.....	2	96.0	—	43.5	+ 7.1
Calomel, 0.5%.....	2	86.0	—10.7	35.0	—13.8
Calomel, 1.5%.....	2	92.0	—	43.25	+ 6.5
Calomel, 4.5%.....	2	96.0	—	43.25	+ 6.5
Sulfur, ½; gypsum, ½	2	92.0	—	35.75	—11.9
Sulfur, ½; lime, ½...	2	98.0	—	43.75	+ 7.7
Sulfur, ¾; gypsum, ¼	2	80.0	—16.9	36.25	—10.7
Sulfur, ¾; lime, ¼...	2	96.0	—	43.0	+ 5.9
Semesan Bel Dip.....	2	94.0	—	35.0	—13.8
Bayer Dip.....	2	96.0	—	40.5	—
Untreated.....	12	96.3	—	40.6	—

*Only gains or losses of more than 5 per cent are listed.

Considering the figures in Table 1, it is evident that since the untreated seed gave a stand of 96.3 per cent, there was little oppor-

tunity for appreciable improvement. Losses in stand due to treatment, however, resulted in three instances, *viz.*, sulfur, sulfur-gypsum ($\frac{3}{4}$ and $\frac{1}{4}$), and calomel (0.5 per cent). Each of these three treatments also showed a distinct decrease in yield, as did also sulfur and gypsum half and half, and Semesan Bel. (See Figs. 1 and 2.)



FIG. 1.—EFFECT OF DUSTING CUT SEED POTATOES WITH SULFUR, 1928.

Row 1, untreated seed; row 2, the same seed cut and dusted with sulfur 16 days before planting. The sulfur-dusted seed gave 15.6 per cent reduction in stand and 9.6 per cent reduction in yield.

Out of the 40 mixtures with which we started, 3 combinations showed special promise. These were sulfur and lime, creosote, and calomel.

THE 1929 RESULTS

The seed potatoes used in 1929 were certified Irish Cobblers grown on Prince Edward Island. The size of lots was 25 pounds and there

were three series of treatments. The dates of cutting and treatment were March 1, 15, and 29. All lots were planted April 1. Each field plat was a single row 83 feet long. The rows were 33 inches apart, and the seed-pieces were spaced 15 inches apart in the row. The total number of plats was 99.



FIG. 2.—COMPARISON OF PLANTS FROM NORMAL AND DECAYED SEED PIECES, 1928.

The plants are the same age, but the seed piece of the right is completely decayed, while that on the left is sound. Decay of the seed piece soon after planting may cause either a skip or a weak plant.

A careful examination of all lots on March 30, one day prior to planting, showed that all lots, treated and untreated, were in excellent condition. The pieces were plump, and those cut March 1 and 15 were all well corked over. There was no decay in any lot, but a few pieces of lot 8 (creosote 3 per cent, March 1 cutting) showed a little mold. This was a purely surface growth and appeared to have done no harm.

Each treatment in each series was represented by three plats and there were also six check plats in each series. The results for each plat were taken separately, and the averages are given in Table 2. Beginning in 1929, there have been recorded, in addition to the

percentage stand, the percentage of weak plants, as it was observed that with certain treatments that year not only did many seed pieces decay and fail to produce plants, but many others which did produce plants were destroyed by decay so early in the life of the plants that

TABLE 2.—EFFECT OF DUST TREATMENTS OF THE CUT SEED ON THE STAND AND YIELD OF POTATOES, 1929.

LOT No.	TREATMENTS	PER-CENT-AGE WEAK PLANTS	PER-CENT-AGE STAND	PER-CENT-AGE GAIN OR LOSS IN STAND DUE TO TREATMENT	AVER-AGE YIELD IN LBS. PER PLAT	PER-CENT-AGE GAIN OR LOSS IN YIELD DUE TO TREATMENT
Series I, Cut March 1						
1	Sulfur.....	42.10	55.88	—36.3	54.0	—41.7
2	Gypsum.....	40.31	63.23	—28.7	62.0	—33.1
3	Sulfur, $\frac{1}{2}$; lime, $\frac{1}{2}$	11.24	87.25	—	112.0	+21.1
4	Same as 3 + 2% creosote..	11.52	90.20	—	102.5	+10.5
5	Gypsum + 2% HgCl.....	7.49	91.67	—	99.5	+ 7.2
6	Gypsum + 4% HgCl.....	10.27	90.69	—	105.0	+13.2
7	Semesan Bel Dip.....	8.68	96.08	+ 9.5	116.5	+25.6
8	Charcoal + 3% creosote..	7.61	90.20	—	107.5	+15.9
9	Charcoal + 5% creosote..	35.52	74.51	—15.1	75.5	—18.6
10	Untreated.....	19.20	87.74	—	92.75	—
Series II, Cut March 15						
1	Sulfur.....	8.12	96.51	—	119.5	+15.1
2	Gypsum.....	5.70	94.61	—	114.0	+ 9.8
3	Sulfur, $\frac{1}{2}$; lime, $\frac{1}{2}$	4.69	95.10	—	119.0	+14.7
4	Same as 3 + 2% creosote..	4.08	96.08	—	118.0	+13.7
5	Gypsum + 2% HgCl.....	10.00	93.14	—	106.0	—
6	Gypsum + 4% HgCl.....	8.29	94.61	—	109.5	+ 5.5
7	Semesan Bel Dip.....	24.18	75.00	—19.6	82.0	—20.9
8	Charcoal + 3% creosote..	5.64	95.59	—	125.0	+20.4
9	Charcoal + 5% creosote..	27.98	82.35	—11.5	91.5	—11.8
10	Untreated.....	9.72	93.15	—	103.75	—
Series III, Cut March 29						
1	Sulfur.....	1.56	97.55	—	130.0	—
2	Gypsum.....	4.61	95.59	—	131.0	—
3	Sulfur, $\frac{1}{2}$; lime, $\frac{1}{2}$	6.77	94.12	—	128.5	—
4	Same as 3 + 2% creosote..	3.92	100.00	+ 7.1	134.5	+ 5.3
5	Gypsum + 2% HgCl.....	5.56	97.08	—	140.5	+ 9.9
6	Gypsum + 4% HgCl.....	4.04	97.08	—	141.0	+10.3
7	Semesan Bel Dip.....	5.03	97.55	—	136.5	+ 6.9
8	Charcoal + 3% creosote..	5.97	98.53	+ 5.5	138.5	+ 8.4
9	Charcoal + 5% creosote..	1.99	98.53	+ 5.5	132.5	—
10	Untreated.....	7.09	93.37	—	127.75	—

they made a very weak growth. Thus, the decay of seed pieces may result either in skips or in weak plants, and in considering the results of the 1929 experiments it will be observed that this connection between low percentage stand and high percentage of weak plants is clearly evident. (See Fig. 3.)



FIG. 3.—COMPARISON OF MATERIALS USED IN DUSTING CUT SEED POTATOES, 1929.

Row 1, seed dusted with sulfur-lime mixture at time of cutting; row 2, same seed untreated; row 3, seed dusted with gypsum; and row 4, seed dusted with sulfur. All seed cut 1 month before planting. As compared with the untreated seed, the sulfur-lime treatment increased yields by 21.1 per cent, while gypsum and sulfur treatments reduced yields by 33.1 and 41.7 per cent, respectively.

The results secured in 1929 were the most striking of any secured in the 4 years covered by these experiments. As soon as the potatoes began to break ground it became evident that there were marked differences in the way different lots of Series I were coming up, and this despite the fact that at the time of planting all lots appeared to be in perfect condition. Three treatments in Series I greatly reduced the stand and increased the number of weak plants. These were sulfur, gypsum, and 5% creosote. The stand figures for all other

treatments were equal or slightly better than those of the untreated checks. The yield data correspond, the three poor treatments giving poor yields and the other treatments giving increases ranging from 7.2 to 25.6 per cent.

Series II, cut 2 weeks before planting, showed no injurious effects from sulfur or gypsum treatments and less reduction for the 5% creosote treatment. Semesan Bel was used as a dip on the seed before cutting and in this series it gave very poor results, just the reverse of the results in Series I. The increases in yield with the better treatments varied from 5.5 to 21.4 per cent, slightly less than with Series I.

Series III, cut 2 days before planting, showed little differences in stand. The yield differences were also slight, the maximum being 10.3 per cent.

In general, the seed cut a month before planting gave both the maximum decreases in yield and the maximum increases in yield from treatment. Sulfur and gypsum reduced yields by 41.7 and 33.1 per cent, respectively, in this series and had no ill effect in Series II and III, cut 2 weeks and 2 days, respectively, before planting. It is to be noted that in 1929 untreated seed cut a month before planting averaged 92.75 pounds per plat, that cut 2 weeks before planting 103.75 pounds, and that cut 2 days before planting 127.75 pounds. The better treatments overcame only in part the decrease in yield that resulted from early cutting.

THE 1930 RESULTS

The results of 1929 made it evident that not only the material but the time the material was used must be considered; as sulfur treatment of seed cut a month ahead of planting reduced yields, while the same treatment of seed cut 2 weeks before planting had no injurious effect. To define the danger line more closely, it was planned in 1930 to cut and dust lots 20 days, 10 days, and 1 day ahead of planting. The number of treatments was reduced to sulfur, gypsum, and the simplest of the good treatments, *viz.*, the combination of equal parts by weight of flowers of sulfur and hydrated lime. The number of replications was increased from three to six plats for each treatment in each series. The kind of seed, size of plats, planting distances, etc., were the same as in 1929. The data are given in Table 3.

TABLE 3.—EFFECT OF SULFUR, SULFUR-LIME, AND GYPSUM DUST TREATMENTS OF THE CUT SEED ON STAND AND YIELD OF POTATOES, 1930.

LOT No.	TREATMENTS	PERCENT-AGE WEAK PLANTS	PER-CENTAGE STAND	PERCENT-AGE GAIN OR LOSS IN STAND DUE TO TREATMENT	AVERAGE YIELD IN LBS. PER PLAT	PERCENTAGE GAIN OR LOSS IN YIELD DUE TO TREATMENT
Series I, Cut March 11						
1	Sulfur.....	10.7	91.0	—7.8	76.62	—5.7
2	Sulfur-lime	3.2	98.7	—	82.41	—
3	Gypsum...	5.5	97.3	—	73.8	—9.2
4	Untreated..	3.6	98.7	—	81.29	—
Series II, Cut March 21						
1	Sulfur.....	1.9	98.2	—	84.86	—
2	Sulfur-lime	1.0	99.8	—	89.75	+8.0
3	Gypsum...	1.2	99.8	—	84.56	—
4	Untreated..	2.5	99.8	—	83.08	—
Series III, Cut March 31						
1	Sulfur.....	1.2	99.3	—	81.58	—
2	Sulfur-lime	3.2	97.6	—	82.17	—
3	Gypsum...	2.9	99.8	—	80.75	—
4	Untreated..	3.2	98.7	—	81.79	—

The spring and early summer of 1930 were very favorable and potato stands in general were excellent. The percentage stand figures for the untreated checks in these experiments (98.7, 99.8, and 98.7) leave little prospect for improvement. Sulfur in Series I, seed cut 20 days before planting, was the only treatment that decreased the percentage stand and yield and increased the percentages of weak plants. Gypsum in Series I also reduced the yield. The previous year it was noted that untreated seed cut just prior to planting out-yielded that cut 2 weeks or a month before. In 1930, untreated seed cut 1, 10, and 20 days before planting yielded very nearly the same.

THE 1931 RESULTS

In 1931, two series were prepared, the one cut and treated March 9 and the other March 19. Both were planted April 10. The 3 per cent creosote dust which had given very favorable results in 1928 and 1929 was again included. In addition to the usual flowers of sulfur-hydrated lime dust, mixtures made with other types of sulfur were tried. One was a dusting sulfur, Kolodust, and the other

Koppers Flotation Ferox dust. Both are very much more finely divided than the flowers of sulfur. The number of replications of treatments was increased again, each treatment in each series being represented by eight plats. Also, there were 16 untreated check plats in each series. The length of the plat rows was reduced to 69 feet. Planting distances were the same as in previous years. The writer is indebted to Professors P. H. Wessels and H. S. Cunningham of the Long Island Vegetable Research Farm for the planting and collecting of data from the 1931 plats. The data are given in Table 4.

TABLE 4.—EFFECT OF DUST TREATMENTS OF THE CUT SEED ON STAND AND YIELD OF POTATOES, 1931.

LOT No.	TREATMENTS	PER-CENTAGE WEAK PLANTS	PER-CENTAGE STAND	PERCENT-AGE GAIN OR LOSS IN STAND DUE TO TREATMENT	AVERAGE YIELD IN LBS. PER PLAT	PERCENT-AGE GAIN OR LOSS IN YIELD DUE TO TREATMENT
Series I, Cut March 9						
1	Sulfur.....	18.5	77.6	—8.8	57.0	—9.4
2	Gypsum.....	17.2	86.3	—	63.37	—
3	Flowers of sulfur, ½; lime, ½....	13.7	92.8	+9.5	64.06	—
4	Kolodust sulfur, ½; lime, ½....	19.4	86.9	—	63.81	—
5	Koppers sulfur, ½; lime, ½....	20.0	87.3	—	61.62	—
6	3% creosote.....	20.5	88.0	—	66.62	+5.8
7	Untreated.....	18.3	85.1	—	62.94	—
Series II, Cut March 19						
1	Sulfur.....	16.6	84.5	—	63.62	—
2	Gypsum.....	19.4	83.5	—	61.37	—
3	Flowers of sulfur, ½; lime, ½....	19.4	83.7	—	64.31	—
4	Kolodust sulfur, ½; lime, ½....	18.8	84.7	—	62.06	—
5	Koppers sulfur, ½; lime, ½....	23.4	82.7	—	64.25	—
6	3% creosote.....	19.9	84.3	—	62.12	—
7	Untreated.....	20.0	82.9	—	62.65	—

As in 1930, the only treatment having a definitely bad effect on stand and yield in 1931 was sulfur dust in Series I (cut March 9). This bad effect was again counteracted by mixing sulfur with hydrated lime. The comparison of different grades of sulfur showed

that the ordinary flowers of sulfur, which is readily obtainable anywhere, was as good and probably better for this purpose than the more finely divided dusting sulfurs. The 3 per cent creosote dust in charcoal again gave good results.

DISCUSSION

As the result of 4 years of field tests with dust treatments for cut potato seed, it appears that certain definite conclusions are possible. Sulfur, the material most commonly used on cut seed potatoes in the Long Island area, increased yield in only one test, *viz.*, 15.1 per cent in Series II in 1929. When used on potato seed cut up to 10 days before planting, sulfur generally exercised no effect either good or bad. On potatoes cut 3 to 4 weeks before planting, sulfur reduced the stand, increased the number of weak plants, and reduced the yield. The percentage reductions in yield from this treatment were 9.8, 41.7, 5.7, and 9.4 for 1928, 1929, 1930, and 1931, respectively. The sulfur-treated pieces corked over well and appeared to be in excellent condition at the time of planting in each of these tests, hence the unfavorable effects would not have been anticipated. Laboratory studies in which potatoes were cut, dusted, and held in a damp chamber⁸ showed that cork formation was not visibly affected, either as to rate or amount, by the sulfur treatment.

Gypsum is another material commonly recommended and used for dusting cut seed. The results with this dust were better than with sulfur. In 1928, it had no bad effect; in 1929, the seed cut and dusted with gypsum a month before planting yielded 33.1 per cent less than the same seed not dusted; in 1930, seed cut and treated 3 weeks before planting yielded 9.2 per cent less; and in 1931, the gypsum dust again had no effect. In only one test was an appreciable yield increase received, *viz.*, 9.8 per cent in Series II, 1929. Laboratory studies indicated that gypsum also did not have any effect upon cork formation.

A sulfur-lime mixture showed none of the harmful effects of sulfur alone. In none of the experiments has it ever reduced yields or decreased the stand. In 1928, it increased yield by 7.7 per cent; in 1929, by 21.1 and 14.7 per cent; in 1930, by 8.0 per cent; while in 1931,

⁸This work was conducted in the laboratories of the Imperial College of Science, London, England, in 1929 and 1930, to which institution the writer is greatly obligated for facilities and assistance.

the results were negative. Hence, it either had no effect or gave slight to moderate increases. In laboratory studies this dust did not affect corking over of the cut surfaces, but the seed pieces were kept in damp chambers. Under the storage conditions of the field experiments, it did have a very noticeable effect. Treated seed pieces stored in bags in the potato cellar showed a tough heavy protective layer over the cut surface. This layer was not easily broken in handling as is the usual cork surface which is quite delicate. This was the only treatment tested that actually appeared to give increased protection to the cut surface of the potato seed piece.

The sulfur-lime mixture composed of equal parts by weight of flowers of sulfur and hydrated lime is readily prepared from materials easily secured, and it is quickly applied with a wire mesh sifter. The rate of application in these tests was $6\frac{1}{2}$ ounces per bushel, the seed pieces averaging 2 ounces.

Creosote-charcoal dust has given good results in these tests and has the advantage that the black dust on the white cut surfaces makes it possible to see at once when these are completely covered, also less material is required. Wood creosote was used and this is not expensive, but it is not practicable for the grower to prepare such a dust, hence it has been given less consideration.

In view of the general use of sulfur on cut seed and the widespread idea that this practise is especially desirable on seed cut in the late winter and stored in bags or barrels for some weeks before planting, it appears that one of the most important results of this study is definite proof that this is a very bad practise. The seed pieces so treated appear to be in perfect condition at the time of planting, but they do not give as good field stands, nor do they yield as well as untreated seed. Mixtures of sulfur and lime, on the other hand, have proved harmless in actual test, and in some cases were beneficial. Furthermore, this treatment, if it had any effect, would tend to make the soil about the seed pieces more acid, since 1 pound of sulfur will neutralize much more than 1 pound of hydrated lime.

CONCLUSIONS

The use of sulfur or gypsum dusts on cut seed potatoes is not to be recommended. These materials are likely to impair stands and reduce yields when used on seed cut and treated 3 to 4 weeks before planting.

Certain dusts have been found which can be used on cut seed without fear of injury and which are sometimes beneficial.

One of the best and most practicable of these was made by mixing equal parts by weight of flowers of sulfur and hydrated lime. This dust sifted on the cut seed at the rate of 6 to 7 ounces per bushel facilitated the formation of a tough protective layer over the cut surfaces. Potatoes cut and treated 3 to 4 weeks before planting were benefited by this treatment.

When potatoes were planted within 10 days of the time of cutting, no treatment had an appreciable effect, either good or bad.